CLAIM AMENDMENTS

1-54. (Cancelled)

55. (Previously Presented) A method of processing sound in a hearing aid, comprising the steps of:

receiving acoustical signals within the hearing aid;

transforming the acoustical signals into digital input signals;

passing a portion of said digital input signals through a plurality of cascaded all-pass filters to form a sequence of delayed samples;

windowing said sequence of delayed samples;

applying a frequency domain transform to said windowed sequence of delayed samples to form a warped sequence;

calculating a plurality of frequency domain level estimates from said warped sequence;

calculating a plurality of frequency domain gain coefficients from said plurality of frequency domain level estimates to form a warped time-domain filter;

calculating a plurality of spectral enhancement gain coefficients from said warped sequence;

calculating a plurality of compression-spectral enhancement gain coefficients from said plurality of frequency domain gain coefficients and said plurality of spectral enhancement gain coefficients;

applying an inverse frequency domain transform on said plurality of compression-spectral enhancement gain coefficients to form a set of time-domain filter coefficients; and

convolving said sequence of delayed samples with said set of time-domain filter coefficients to produce a digital output signal.

56-59. (Cancelled)

60. (Previously Presented) The method of claim 55, wherein the hearing aid is configured to be mounted on the ear of a user.

61. (Previously Presented) The method of claim 55, wherein the hearing aid is an in-the-canal hearing aid.

62. (Previously Presented) The method of claim 55, wherein the hearing aid is an in-the-ear hearing aid.

63. (Previously Presented) The method of claim 55, wherein the hearing aid is a behind-the-ear hearing aid.

64. (Previously Presented) A hearing aid for correcting a hearing impairment of a user, comprising:

an input signal channel having a microphone and providing digital input signals;

a plurality of cascaded all-pass filters, wherein said digital input signals pass through said plurality of cascaded all-pass filters, and wherein said plurality of cascaded all-pass filters output a sequence of delayed samples;

means for applying a frequency domain transform on said sequence of delayed samples, wherein a warped sequence results from said frequency domain transform applying means;

means for calculating a plurality of frequency domain level estimates from said warped sequence;

means for calculating a plurality of frequency domain gain coefficients from said plurality of frequency domain level estimates;

means for calculating a plurality of spectral enhancement gain coefficients from said warped sequence;

means for calculating a plurality of compression-spectral enhancement gain coefficients from said plurality of frequency domain gain coefficients and said plurality of spectral enhancement gain coefficients;

means for applying an inverse frequency domain transform on said plurality of compression-spectral enhancement gain coefficients, wherein a set of time-domain filter coefficients of a compression gain filter result from said inverse frequency domain transform applying means;

means for convolving said sequence of delayed samples with said set of time-domain filter coefficients to produce a digital output signal; and

an output conversion means adapted to convert said digital output signal to an audio output.

65. (Previously Presented) A hearing aid for correcting a hearing impairment of a user, comprising:

an input signal channel having a microphone and providing digital input signals;

an input data buffer, said input data buffer holding at least one block of data comprised of a portion of said digital input signals;

a plurality of cascaded all-pass filters, wherein a first block of said digital input signals pass from said input data buffer through said plurality of cascaded all-pass filters, and wherein said plurality of cascaded all-pass filters output a first sequence of delayed samples;

means for windowing a first portion of said first sequence of delayed samples, wherein a first windowed sequence of delayed samples results from said windowing means;

means for applying a first frequency domain transform on said first windowed sequence of delayed samples, wherein a first warped sequence results from said first frequency domain transform applying means;

means for calculating a first plurality of frequency domain level estimates of said first warped sequence;

means for calculating a first plurality of spectral enhancement gain coefficients from said first warped sequence;

means for windowing a second portion of said first sequence of delayed samples, wherein a second windowed sequence of delayed samples results from said windowing means;

means for applying a second frequency domain transform on said second windowed sequence of delayed samples, wherein a second warped sequence results from said second frequency domain transform applying means;

means for calculating a second plurality of frequency domain level estimates of said second warped sequence;

means for calculating a first plurality of spectral enhancement gain coefficients from said first warped sequence;

means for summing said first and second plurality of spectral enhancement gain coefficients, wherein a summed first and second plurality of spectral enhancement gain coefficients results from said summing means;

means for summing said first and second plurality of frequency domain level estimates, wherein a summed first and second plurality of frequency domain level estimates results from said summing means;

means for normalizing said summed first and second plurality of frequency domain level estimates, wherein a normalized first and second plurality of frequency domain level estimates results from said normalizing means;

means for calculating a plurality of frequency domain gain coefficients from said normalized first and second plurality of frequency domain level estimates;

means for calculating a plurality of compression-spectral enhancement gain coefficients from said plurality of frequency domain gain coefficients and said summed first and second plurality of spectral enhancement gain coefficients;

means for applying an inverse frequency domain transform on said plurality of compression-spectral enhancement gain coefficients, wherein a set of time-domain filter coefficients of a compression gain filter result from said inverse frequency domain transform applying means;

means for convolving a second sequence of delayed samples with said time-domain filter coefficients, said second sequence of delayed samples produced by a second block of said digital input signals passing from said input data buffer through said plurality of cascaded all-pass filters, wherein a digital output signal results from said convolving means; and

an output conversion means adapted to convert said digital output signal to an audio output.

66. (Previously Presented) A hearing aid for correcting a hearing impairment of a user, comprising:

an input signal channel having a microphone and providing digital input signals;

an input data buffer, said input data buffer holding a block of data of size M comprised of a portion of said digital input signals;

a plurality of cascaded all-pass filters comprised of 2M cascaded all-pass filters, wherein a first block of said digital input signals pass from said input data buffer through said plurality of cascaded all-pass filters to form a first sequence of delayed samples and wherein a second block of said digital input signals pass from said input data buffer through said plurality of cascaded all-pass filters to form a second sequence of delayed samples, and wherein said first sequence of delayed samples and said second sequence of delayed samples form a combined sequence of delayed samples;

means for windowing a first portion of said combined sequence of delayed samples, wherein said first portion is of size M, wherein a windowed sequence of delayed samples results from said windowing means;

means for applying a 2M-point frequency domain transform on said windowed sequence of delayed samples, wherein a warped sequence results from said frequency domain transform applying means;

means for calculating a plurality of frequency domain level estimates of said warped sequence;

means for calculating a plurality of frequency domain gain coefficients from said plurality of frequency domain level estimates;

means for calculating a plurality of spectral enhancement gain coefficients from said warped sequence;

means for calculating a plurality of compression-spectral enhancement gain coefficients from said plurality of frequency domain gain coefficients and said plurality of spectral enhancement gain coefficients;

means for applying an inverse frequency domain transform on said plurality of compression-spectral enhancement gain coefficients, wherein a set of time-domain filter coefficients of a compression gain filter result from said inverse frequency domain transform applying means; and

means for convolving a second portion of said combined sequence of delayed samples with said set of time-domain filter coefficients, wherein said second portion is of size M, wherein a digital output signal results from said convolving means; and

an output conversion means adapted to convert said digital output signal to an audio output.

67. (New) The frequency-warped processing system of claim 64, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm raises a power spectrum comprised of said plurality of frequency domain level estimates to a power greater than 1.

68. (New) The frequency-warped processing system of claim 64, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm amplifies a plurality of peaks of said warped sequence.

69. (New) The frequency-warped processing system of claim 68, wherein said spectral enhancement algorithm further comprises means for identifying said plurality of peaks, said identifying means including means for applying a second-difference operator to said warped sequence.

69. (New) The frequency-warped processing system of claim 64, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral

enhancement algorithm, wherein said spectral enhancement algorithm includes means for forming an unsmeared warped sequence, and means for calculating the difference between said warped sequence and said unsmeared warped sequence.

70. (New) The frequency-warped processing system of claim 64, further comprising a hearing aid, wherein the frequency-warped processing system is incorporated within said hearing aid.

71. (New) The frequency-warped processing system of claim 64, wherein said plurality of frequency domain gain coefficients comprise a warped time-domain filter.

72. (New) The frequency-warped processing system of claim 64, further comprising means for windowing said sequence of delayed samples, wherein a windowed sequence of delayed samples results from said windowing means, and wherein said warped sequence results from applying said frequency domain transform to said windowed sequence of delayed samples.

73. (New) The frequency-warped processing system of claim 64, further comprising a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals.

74. (New) The frequency-warped processing system of claim 73, further comprising an output transducer, said output transducer converting said analog output signals to an audio output.

75. (New) The frequency-warped processing system of claim 64, said plurality of cascaded all-pass filters comprising a plurality of first order all-pass filters.

76. (New) The frequency-warped processing system of claim 64, said sequence of delayed samples comprising 16 samples.

77. (New) The frequency-warped processing system of claim 64, further comprising a digital processor, wherein said digital processor is adapted to provide said frequency domain transform applying means, said frequency domain level estimates calculating means, said frequency domain gain coefficients calculating means, said spectral enhancement gain coefficients calculating means, said inverse frequency domain transform applying means, and said means for convolving said sequence of delayed samples.

78. (New) The frequency-warped processing system of claim 77, wherein said digital processor comprises a software programmable digital signal processor.

79. (New) The frequency-warped processing system of claim 64, wherein said frequency domain transform applying means uses a transform selected from the group consisting of discrete Fourier transforms, fast Fourier transforms, Goertzel transforms, and discrete cosine transforms.

80. (New) The frequency-warped processing system of claim 64, further comprising:

an input transducer, said input transducer converting audio input signals to analog input signals; and

an analog-to-digital converter, said analog-to-digital converter converting said analog input signals to said digital input signals.

81. (New) The frequency-warped processing system of claim 64, further comprising:

a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals; and

an output transducer, said output transducer converting said analog output signals to an audio output.

82. (New) The frequency-warped processing system of claim 65, said means for calculating said first and second plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm raises a power spectrum comprised of said plurality of frequency domain level estimates to a power greater than 1.

83. (New) The frequency-warped processing system of claim 65, said means for calculating said first and second plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm amplifies a plurality of peaks of said warped sequence.

84. (New) The frequency-warped processing system of claim 83, wherein said spectral enhancement algorithm further comprises means for identifying said plurality of peaks, said identifying means including means for applying a second-difference operator to said warped sequence.

85. (New) The frequency-warped processing system of claim 65, said means for calculating said first and second plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm includes means for forming an unsmeared warped sequence, and means for calculating the difference between said warped sequence and said unsmeared warped sequence.

86. (New) The frequency-warped processing system of claim 65, further comprising a hearing aid, wherein the frequency-warped processing system is incorporated within said hearing aid.

87. (New) The frequency-warped processing system of claim 65, wherein said plurality of frequency domain gain coefficients comprise a warped time-domain filter.

88. (New) The frequency-warped processing system of claim 65, further comprising a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals.

89. (New) The frequency-warped processing system of claim 88, further comprising an output transducer, said output transducer converting said analog output signals to an audio output.

90. (New) The frequency-warped processing system of claim 65, said plurality of cascaded all-pass filters comprising a plurality of first order all-pass filters.

91. (New) The frequency-warped processing system of claim 65, further comprising a digital processor, wherein said digital processor is adapted to provide said windowing means, said means for applying said first and second frequency domain transforms, said means for calculating said first and second plurality of frequency domain level estimates, said summing means, said normalizing means, said frequency domain gain coefficients calculating means, said inverse frequency domain transform applying means, and said convolving means.

92. (New) The frequency-warped processing system of claim 65, wherein said means for applying said first and second frequency domain transforms use a transform selected from the group consisting of discrete Fourier transforms, fast Fourier transforms, Goertzel transforms, and discrete cosine transforms.

93. (New) The frequency-warped processing system of claim 65, further comprising:

an input transducer, said input transducer converting audio input signals to analog input signals; and

an analog-to-digital converter, said analog-to-digital converter converting said analog input signals to said digital input signals.

94. (New) The frequency-warped processing system of claim 65, further comprising:

a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals; and

an output transducer, said output transducer converting said analog output signals to an audio output.

95. (New) The frequency-warped processing system of claim 65, wherein said windowing means provides a 50 percent overlap of said first and second pluralities of frequency domain level estimates.

96. (New) The frequency-warped processing system of claim 65, wherein a quantity of samples corresponding to said first block of said digital input signals is equivalent to a quantity of first order all-pass filters corresponding to said plurality of cascaded all-pass filters.

97. (New) The frequency-warped processing system of claim 96, wherein said first portion of said first sequence of delayed samples is comprised of a first half of said first sequence of delayed samples and said second portion of said first sequence of delayed samples is comprised of a second half of said first sequence of delayed samples.

98. (New) The frequency-warped processing system of claim 66, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral

enhancement algorithm, wherein said spectral enhancement algorithm raises a power spectrum comprised of said plurality of frequency domain level estimates to a power greater than 1.

99. (New) The frequency-warped processing system of claim 66, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm amplifies a plurality of peaks of said warped sequence.

100. (New) The frequency-warped processing system of claim 99, wherein said spectral enhancement algorithm further comprises means for identifying said plurality of peaks, said identifying means including means for applying a second-difference operator to said warped sequence.

101. (New) The frequency-warped processing system of claim 66, said means for calculating said plurality of spectral enhancement gain coefficients further comprising a spectral enhancement algorithm, wherein said spectral enhancement algorithm includes means for forming an unsmeared warped sequence, and means for calculating the difference between said warped sequence and said unsmeared warped sequence.

102. (New) The frequency-warped processing system of claim 66, further comprising a hearing aid, wherein the frequency-warped processing system is incorporated within said hearing aid.

103. (New) The frequency-warped processing system of claim 66, wherein said plurality of frequency domain gain coefficients comprise a warped time-domain filter.

104. (New) The frequency-warped processing system of claim 66, further comprising a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals.

105. (New) The frequency-warped processing system of claim 104, further comprising an output transducer, said output transducer converting said analog output signals to an audio output.

106. (New) The frequency-warped processing system of claim 66, said plurality of cascaded all-pass filters comprising a plurality of first order all-pass filters.

107. (New) The frequency-warped processing system of claim 66, further comprising a digital processor, wherein said digital processor is adapted to provide said windowing means, said means for applying said 2M-point frequency domain transform, said means for calculating said plurality of frequency domain level estimates, said frequency domain gain coefficients calculating means, said inverse frequency domain transform applying means, and said convolving means.

108. (New) The frequency-warped processing system of claim 66, wherein said means for applying said frequency domain transform uses a transform selected from the group consisting of discrete Fourier transforms, fast Fourier transforms, Goertzel transforms, and discrete cosine transforms.

109. (New) The frequency-warped processing system of claim 66, further comprising:

an input transducer, said input transducer converting audio input signals to analog input signals; and

an analog-to-digital converter, said analog-to-digital converter converting said analog input signals to said digital input signals.

110. (New) The frequency-warped processing system of claim 66, further comprising: a digital-to-analog converter, said digital-to-analog converter converting said digital output signals to analog output signals; and an output transducer, said output transducer converting said analog output signals to an audio output.